

# SERVICE MANUAL

DIGITAL SYNTHESIZER TUNER

## SANSUI TU-D33X TU-D33XL



### CAUTION

1. Parts identified by the  $\Delta$  symbol on the schematic diagram and the parts list are critical for safety. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage-current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the appliance to the customer.

*Sansui*

SANSUI ELECTRIC CO., LTD.

### •SPECIFICATIONS

#### TU-D33X

<b>FM Section</b>	
<b>Tuning range</b>	88 to 108 MHz
<b>Usable sensitivity</b>	
Mono IHF	10.8 dBf (1.9 $\mu$ V : T100)
DIN	0.95 $\mu$ V
<b>50 dB quieting sensitivity</b>	
Mono	16.0 dBf
Stereo	36.0 dBf
<b>Signal to noise ratio at 65 dBf</b>	
Mono	78 dB
Stereo	72 dB
<b>Distortion at 65 dBf</b>	
Mono	less than 0.08% at 1,000 Hz
Stereo	less than 0.12% at 1,000 Hz
<b>Alternate channel selectivity (at 400 kHz)</b>	
	60 dB
<b>Capture ratio</b>	1.0 dB
<b>Image response ratio</b>	45 dB
<b>Spurious response ratio</b>	75 dB
<b>Stereo separation</b>	40 dB at 1,000 Hz
<b>Frequency response</b>	
Stereo	30 to 15,000 Hz, +0.3 dB, -0.8 dB
<b>Antenna input impedance</b>	
	300 ohms balanced
	75 ohms unbalanced
<b>AM Section</b>	
<b>Tuning range</b>	530 to 1,600 kHz
<b>Usable sensitivity</b>	50 dB/m (316 $\mu$ V/m)
<b>Signal to noise ratio</b>	50 dB
<b>Image response ratio</b>	45 dB at 1,000 kHz
<b>Others</b>	
<b>Output voltage and impedance</b>	775 mV/2.2 kohms
<b>Power requirements</b>	120/220/240V, 50/60 Hz
For U.S.A. and Canada	120V (60 Hz)
<b>Power consumption</b>	9 watts
<b>Dimensions</b>	430 mm (16-15/16")W 46 mm (1-13/16")H 227 mm (8-15/16")D
<b>Weight</b>	2.3 kg (5.1 lbs) net 2.9 kg (6.4 lbs) packed

#### TU-D33XL

<b>FM Section</b>	
<b>Tuning range</b>	88 to 108 MHz
<b>Usable sensitivity</b>	
Mono IHF	10.8 dBf (1.9 $\mu$ V : T100)
DIN	0.95 $\mu$ V
<b>50 dB quieting sensitivity</b>	
Mono	16.0 dBf
Stereo	36.0 dBf
<b>Signal to noise ratio at 65 dBf</b>	
Mono	78 dB
Stereo	72 dB
<b>Distortion at 65 dBf</b>	
Mono	less than 0.08% at 1,000 Hz
Stereo	less than 0.12% at 1,000 Hz
<b>Alternate channel selectivity (at 400 kHz)</b>	
	60 dB
<b>Capture ratio</b>	1.0 dB
<b>Image response ratio</b>	45 dB
<b>Spurious response ratio</b>	75 dB
<b>Stereo separation</b>	40 dB at 1,000 Hz
<b>Frequency response</b>	
Stereo	30 to 15,000 Hz, +0.3 dB, -0.8 dB
<b>Antenna input impedance</b>	
	300 ohms balanced
	75 ohms unbalanced
<b>AM (MW, LW) Section</b>	
<b>Tuning range</b>	MW: 530 to 1,600 kHz LW: 153 to 360 kHz
<b>Usable sensitivity</b>	MW: 50 dB/m (316 $\mu$ V/m) LW: 60 dB/m at 250 kHz
<b>Signal to noise ratio (MW)</b>	50 dB
<b>Image response ratio (MW)</b>	45 dB at 1,000 kHz
<b>Others</b>	
<b>Output voltage and impedance</b>	775 mV/2.2 kohms
<b>Power requirements</b>	220/240V, 50/60 Hz
<b>Power consumption</b>	9 watts
<b>Dimensions</b>	430 mm (16-15/16")W 46 mm (1-13/16")H 227 mm (8-15/16")D
<b>Weight</b>	2.3 kg (5.1 lbs) net 2.9 kg (6.4 lbs) packed

\* Design and specifications subject to changes without notice for improvements.

\* In order to simplify the explanation illustrations may sometimes differ from the originals.

## CAUTION

1. The symbols, UL, CSA, SA, BS, UK, EU, AS and XX on the parts list and the schematic diagram mean followings respectively.

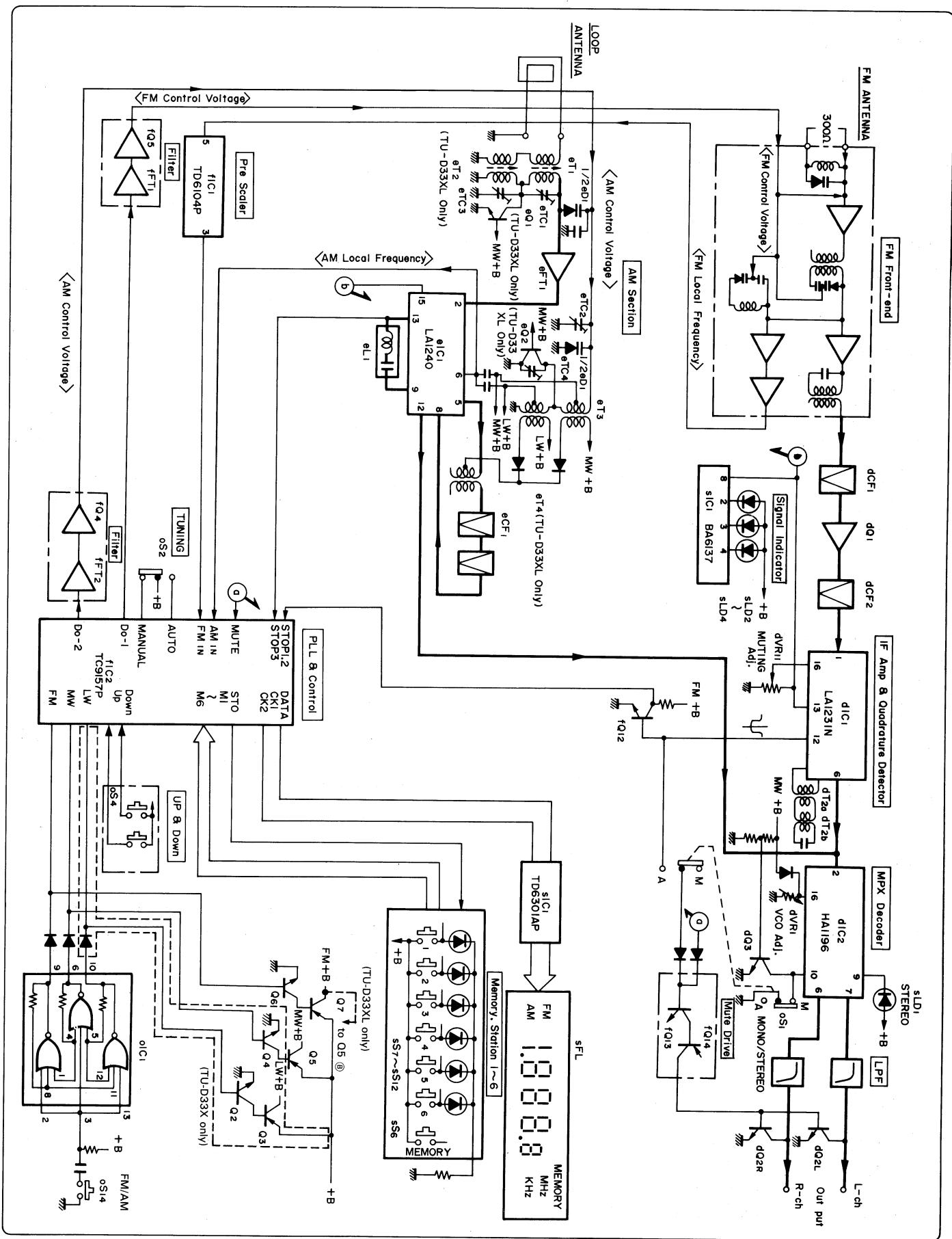
UL..... Manufactured for U.S.A market.  
 (Underwriters Laboratories approved model.)  
 CSA ..... Manufactured for Canadian market.  
 SA..... Manufactured for South African market.  
 BS, UK ..... Manufactured for United Kingdom market.  
 EU ..... Manufactured for European market.  
 AS..... Manufactured for Australian market.  
 XX..... Standard Version.  
 NON MARK ..... Common Parts.

2. Some printed circuit boards are not supplied as the assembled. To separate these in this service manual, the stock No's are not indicated at the ends of the board names. However, the individual parts on the circuit boards are provided by orders.
3. Since some of capacitors and resistors are omitted from parts lists in this service manual, refer to the Common Parts List for capacitors & resistors, which was issued on February 1983.
4. Abbreviations in this service manual are as follows.

### •Abbreviations List

C.R. : Carbon Resistor	E.B.L. : Low Leak Bi-Polar Electrolytic Capacitor
S.R. : Solid Resistor	Ta.C. : Tantalum Capacitor
Ce.R. : Cement Resistor	F.C. : Film Capacitor
M.R. : Metal Film Resistor	M.P. : Metalized Paper Capacitor
F.R. : Fusing Resistor	P.C. : Polystyrene Capacitor
N.I.R. : Non-Inflammable Resistor	G.C. : Gimmic Capacitor
A.R. : Array Resistor	A.C. : Array Capacitor
C.C. : Ceramic Capacitor	V.R. : Variable Resistor
C.T. : Ceramic Capacitor, Temperature Compensation	S.V.R. : Semi Variable Resistor
E.C. : Electrolytic Capacitor	SW. : Switch
E.L. : Low Leak Electrolytic Capacitor	Chip R. : Chip Resistor
E.B. : Bi-Polar Electrolytic Capacitor	Chip C. : Chip Capacitor

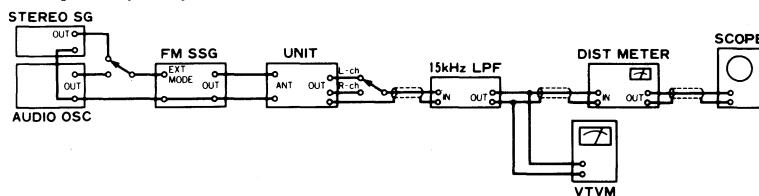
## 1. BLOCK DIAGRAM



## 2. ADJUSTMENTS

### 2-1. FM Adjustment (See Top View on Page 11)

#### 1) FM IF & Reference Frequency Adjustment (See Parts Location on page 6, 7)



Note: 1. SELECTOR ..... FM 2. FM MUTING/MODE ..... OFF/MONO

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	IF Coil Adj.	98MHz ANT Input 20dBf (14.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	Between Point(A) (dVR11, F-4600) & Earth DC Volt Meter	IFT Coil (Front-end)	Max. DC Volt	
2.	Discriminator Coil Adj. In case of using Genescope	1 No Input	—	Between Test Point(B) & Point(C) (F-4600) DC Volt Meter	dT1 (F-4658)	DC 0V±30mV	• Repeat procedures as stated in subject 1 & 2.
		2 Output 60dB, Genescope	Point(D) (JW51)	Between Point(E) (JW13 or 2 & Earth)	dT2 (F-4658)	Steep linearity of S curve. Make symmetrical S curve.	
	Discriminator Coil Adj. In case of using Dist meter	1 No Input	—	Between Test Point(B) & Point(C) (F-4600) DC Volt Meter	dT1 (F-4658)	DC 0V±30mV	• Repeat procedures as stated in subject 1 & 2.
		2 98MHz ANT Input 65dBf (59.8dB), 1kHz (100% MOD.), FM SSG	ANT terminal 300Ω	• Output Terminal VTVM/SCOPE & Dist Meter	dT2 (F-4658)	Min. THD	

#### •ADJUSTMENT FOR FM

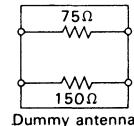
There are two kind in indication of FM SSG output attenuator

1. Attenuator with marking of  $75\Omega$  open ..... open indication type.
2. Attenuator with marking of  $75\Omega$  load or close ..... load or close indication type.

FM SG output level in this FM adjustment are described as open indication type.

To feed FM signal, a dummy antenna circuit as Fig. 2-1 must be connected between FM SG output and ANT terminal (300Ω) of the unit.

Fig. 2-1



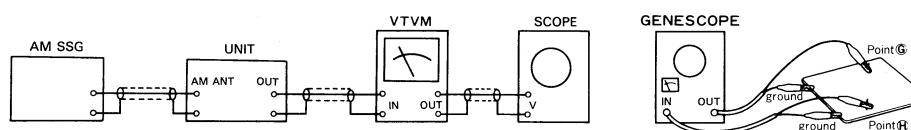
- The following table shows relations among FM SG attenuator indication (dB), available power ratio (dBf) and antenna terminal voltage (dB/μV) in each indication type.

	FM SG Attenuator Indication	Available Power Ratio	Antenna Terminal Voltage
Open indication type	0 dB 66 dB	-0.8 dBf 65.2 dBf	-6 dB/μV 60 dB/μV
Load or close indication type	0 dB 60 dB	5.2 dBf 65.2 dBf	0 dB/μV 60 dB/μV

#### 2) FM STEREO Adjustment

1. SELECTOR ..... FM 2. FM MUTING/MODE ..... AUTO

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	PLL VCO Adj.	98MHz ANT Input 65dBf (59.8dB), FM SSG, Pilot 19kHz (9% MOD.), R or L MODE 1kHz+Pilot (100% MOD.), STEREO SG	ANT terminal 300Ω	Stereo Indicator	dVR1 (F-4659)	Light indicator	Adjust the dVR1 within center of light level
	PLL VCO Adj. In case of using Freq.	98MHz ANT Input 65dBf (59.8dB), FM SSG, No MOD.	Same as above	Between Point(F) (Pin 9 of dIC2) & Earth Freq. Counter	dVR1 (F-4659)	19kHz±50Hz	
2.	Muting level Adj.	98MHz ANT Input 22dBf (16.8dB), FM SSG, Pilot 19kHz (9% MOD.), L or R MODE 1kHz+Pilot (100% MOD.) STEREO SG.	Same as above	Stereo indicator OUTPUT L-CH or R-CH, VTVM & SCOPE	dVR11 (F-4600)	Stereo indicator turns ON or Out- put Signal comes out	

**2-2. AM Adjustment (See Top View on Page 11)****1) AM IF Adjustment & MW (AM) Tuning Adjustment**

Note: 1) SELECTOR..... AM (TU-D33X)/MW (TU-D33XL)

2) Connect AM loop antenna to AM antenna terminal.

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	IF Coil Adj.	Genescope Output 0dB	Point G (JW4 or 21) (F-4657)	Between Point H (eC26, F-4657) & Earth	eT5, eL1 (F-4657)	Max, Waveform	 • Before this adjustment, remove the F-4659 circuit board. Refer to 'how to remove it' on page 4.
2.	522kHz (9kHz step) or 520kHz (10kHz step) Tuning Adj.	No Input	—	Between Point I (eR2, F-4600) & Earth DC Volt Meter	eT3 (F-4600)	1V ± 0.1V	• Repeat procedures as stated in subject 2 & 3.
3.	1610kHz (10kHz step) or 1611kHz (9kHz step) Tuning Adj.	No Input	—	Same as above	eTC2 (F-4600)	8V ± 0.1V	
4.	603kHz (9kHz step) or 600kHz (10kHz step) RF Adj.	603kHz (or 600kHz) ANT Input 30dB 400Hz (30% MOD.), AM SSG	ANT terminal	Output Terminal L-CH or R-CH VTVM & SCOPE	eT1 (F-4600)	Max. Output	
5.	1404kHz (9kHz step) or 1400kHz (10kHz step) RF Adj.	1404kHz (or 1400kHz) ANT Input 30dB 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC1 (F-4600)	Max. Output	

**2) LW Tuning Adjustment (TU-D33XL only)**

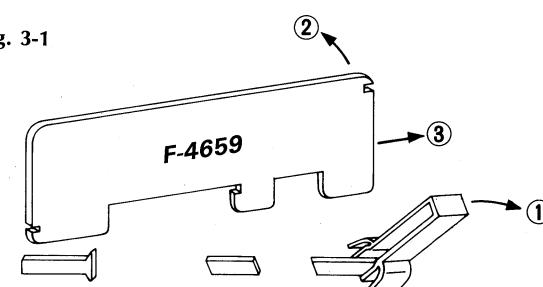
Note: SELECTOR..... LW

STEP	SUBJECT	FEED SIGNAL		MEASURE OUTPUT	ADJUST	ADJUST FOR	REMARKS
		FROM	TO				
1.	153kHz Tuning Adj.	No Input	—	Between Point I (eR2, F-4600) & Earth DC Volt Meter	eT4 (F-4600)	1V ± 0.1V	• Repeat procedures as stated in subject 1 & 2.
2.	360kHz Tuning Adj.	No Input	—	Same as above	eTC4 (F-4600)	8V ± 0.1V	
3.	170kHz RF Adj.	170kHz ANT Input 30dB 400Hz (30% MOD.), AM SSG	ANT terminal	Output Terminal L-CH or R-CH VTVM & SCOPE	eT2 (F-4600)	Max. Output	
4.	300kHz RF Adj.	300kHz ANT Input 30dB 400Hz (30% MOD.), AM SSG	Same as above	Same as above	eTC3 (F-4600)	Max. Output	

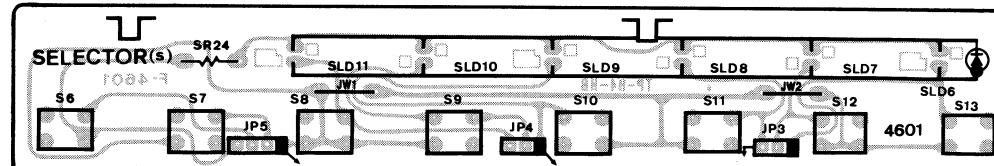
**3. HOW TO REMOVE F-4659 CIRCUIT BOARD**

- 1) Remove bonnet and bottom plate.
- 2) Remove tension wire.
- 3) Unsolder the F-4659 circuit board connection points.
- 4) Pull the F-4659 circuit board holder into the arrow direction ①.
- 5) Pull the circuit board into the arrow direction ②.
- 6) Pull out the circuit board into the arrow direction ③.

Fig. 3-1

**4. PARTS LOCATION & PARTS LIST****4-1. F-4601 Preset Memory Circuit Board**

Component Side



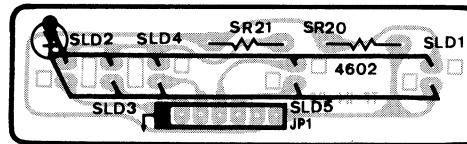
Parts List

Parts No.	Stock No.	Description
oS6	46708100	Push SW., MEMORY
oS7	46708100	Push SW., 1
oS8	46708100	Push SW., 2
oS9	46708100	Push SW., 3

Parts No.	Stock No.	Description
oS10	46708100	Push SW., 4
oS11	46708100	Push SW., 5
oS12	46708100	Push SW., 6
oS13	46708100	Push SW., FM/AM

**4-2. F-4602 SIGNAL, LOCKED & STEREO Indicator Board**

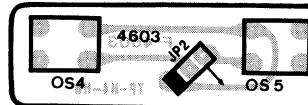
Component Side



Parts List		
Parts No.	Stock No.	Description
•LED		
sLD1	46176900	TLS-123
	or 46470200	SEL2210S
sLD2	46470300	SEL2410E
sLD3	46470300	SEL2410E
sLD4	46470300	SEL2410E
sLD5	07251000	TLY-123

**4-3. F-4603 UP, DOWN SW. Board**

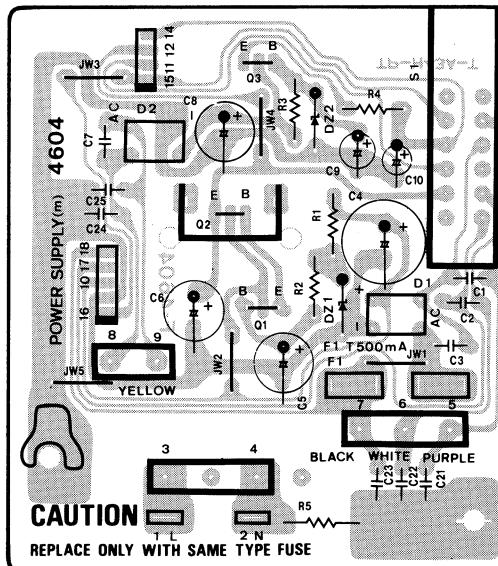
Component Side



Parts List		
Parts No.	Stock No.	Description
oS4	46708100	Push SW., DOWN
oS5	46708100	Push SW., UP

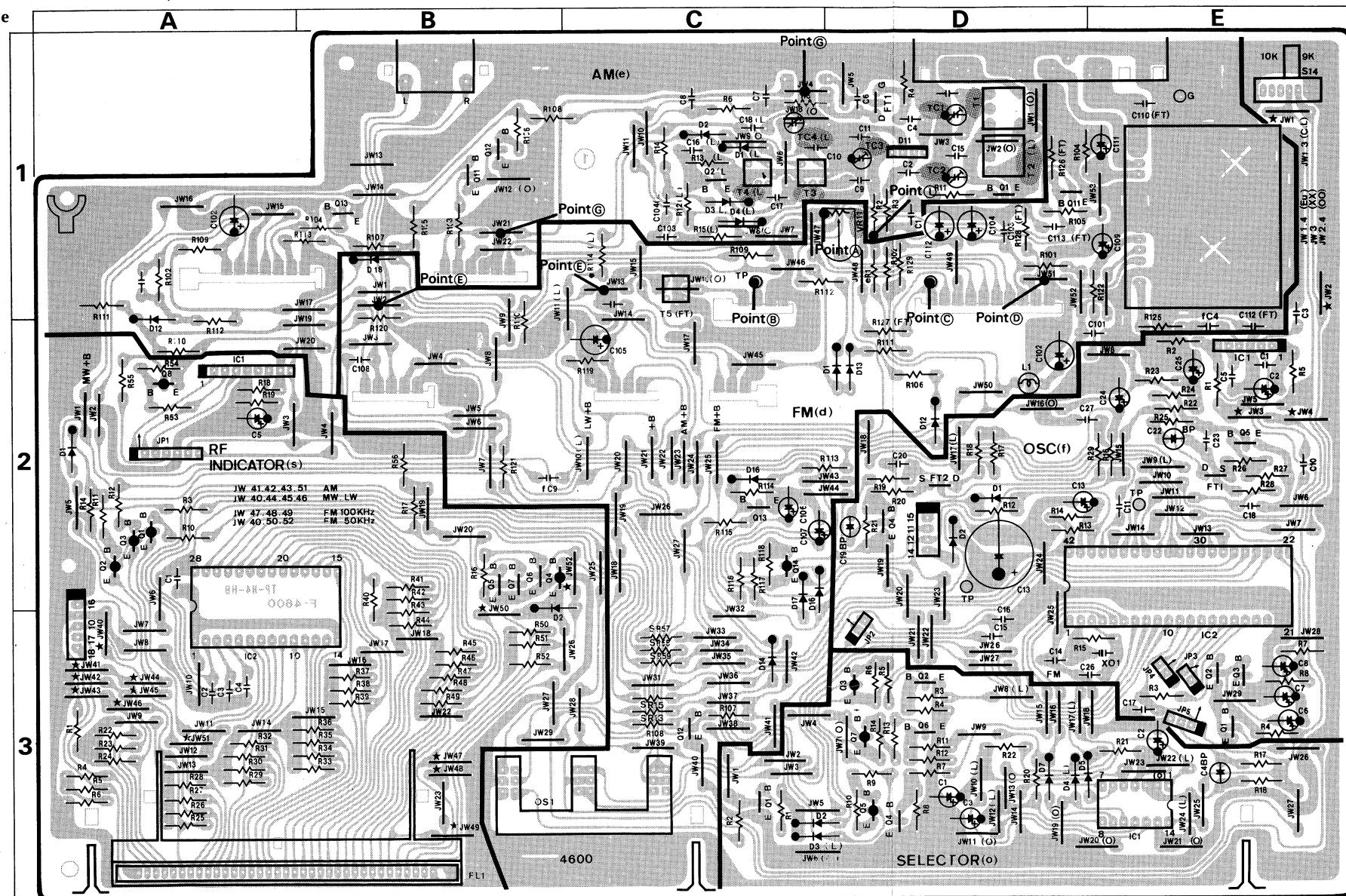
**4-4. F-4604 Power Supply Circuit Board**

Component Side



## 4-5. F-4600 Main Circuit Board (Stock No. TU-D33X = 00814701) (Stock No. 00815705 = TU-D33XL)

Component Side



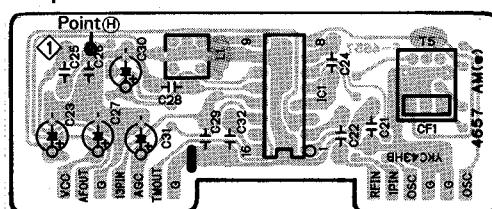
## Parts List &lt;F-4600&gt;

Parts No.	Stock No.	Description
oQ4	46367101	2SC2603 (TU-D33XL)
	or 46367301	2SC2458 (TU-D33XL)
	or 46391901	2SC2785 (TU-D33XL)
oQ5	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
oQ6	46367101	2SC2603
	or 46367301	2SC2458
	or 46391901	2SC2785
oQ7	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
•IC		
oIC1	46426900	$\mu$ PD4025BC
	or 48055000	MSM4025BRS
	or 48122900	HD14025BP
	or 48123000	TC4025BP
•Diode		
oD2	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
oD3	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
oD4	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
oD5	03117600	1S2473T77
	or 46086000	1S1588TP-3
oD7	03117600	1S2473T77
	or 46086000	1S1588TP-3
oC4	08450800	3.3 $\mu$ F 16V E.B.
oS1	48069500	Push SW., FM MODE, TUNING, FM NOISE CANCELLER
oS14	46177200	Slide SW., AM STEP (TU-D33X-XX)
oZ1	46547300	4P Terminal Board, Antenna
oZ2	48148500	2P Terminal Board, OUTPUT
•Transistor		
sQ1	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
sQ2	46367001	2SA1115 (TU-D33XL)
	or 46367201	2SA1048 (TU-D33XL)
	or 46392001	2SA1175 (TU-D33XL)
sQ3	46367001	2SA1115 (TU-D33XL)
	or 46367201	2SA1048 (TU-D33XL)
	or 46392001	2SA1175 (TU-D33XL)

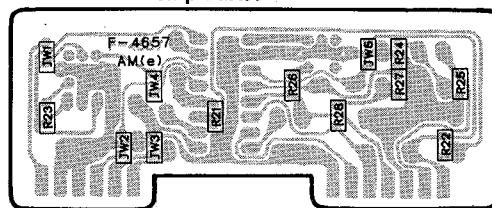
Parts No.	Stock No.	Description
sQ4	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
sQ5	46367101	2SC2603 (TU-D33XL, TU-D33X-SA,EU,AS)
	or 46367301	2SC2458 (TU-D33XL, TU-D33X-SA,EU,AS)
	or 46391901	2SC2785 (TU-D33XL, TU-D33X-SA,EU,AS)
sQ6	46367101	2SC2603 (TU-D33XL, TU-D33X-SA,EU,AS)
	or 46367301	2SC2458 (TU-D33XL, TU-D33X-SA,EU,AS)
	or 46391901	2SC2785 (TU-D33XL, TU-D33X-SA,EU,AS)
sQ7	46367101	2SC2603 (TU-D33XL, TU-D33X-SA,EU,AS)
	or 46367301	2SC2458 (TU-D33XL, TU-D33X-SA,EU,AS)
	or 46391901	2SC2785 (TU-D33XL, TU-D33X-SA,EU,AS)
sQ8	46367001	2SA1115
	or 46367201	2SA1048
	or 46392001	2SA1175
•IC		
sIC1	46197200	BA6137
sIC2	46410100	TD6301AP
•Diode		
sD1	03117600	1S2473T77 (TU-D33XL)
	or 46086000	1S1588TP-3 (TU-D33XL)
sD2	03117600	1S2473T77 (TU-D33XL, TU-D33X-SA,EU,AS)
	or 46086000	1S1588TP-3 (TU-D33XL, TU-D33X-SA,EU,AS)
sFL1	48056000	FL. Display Tube FG78L8GR
•LED		
sLD6	46176900	TLS-123
	or 46470200	SEL2210S
sLD7	46176900	TLS-123
	or 46470200	SEL2210S
sLD8	46176900	TLS-123
	or 46470200	SEL2210S
sLD9	46176900	TLS-123
	or 46470200	SEL2210S
sLD10	46176900	TLS-123
	or 46470200	SEL2210S
sLD11	46176900	TLS-123
	or 46470200	SEL2210S

## 4-6. F-4657 AM IF Circuit Board (Stock No. TU-D33X = 00814201) (Stock No. 00815205 = TU-D33XL)

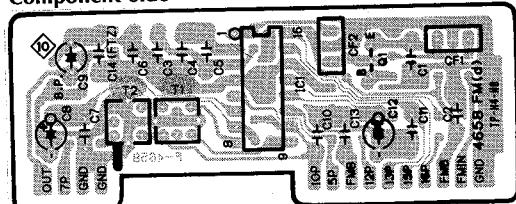
## Component Side



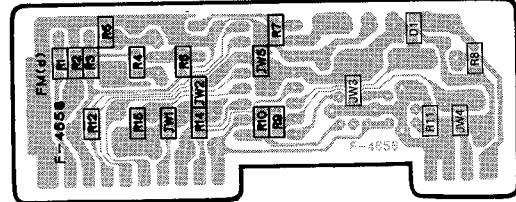
## Pattern Side &lt;Chip Parts&gt;



**4-7. F-4658 FM IF Amp. Circuit Board** (Stock No. 00814301)  
Component Side



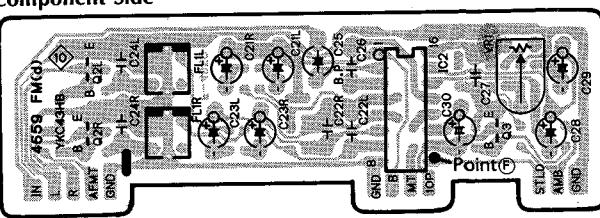
### Pattern Side <Chip Parts>



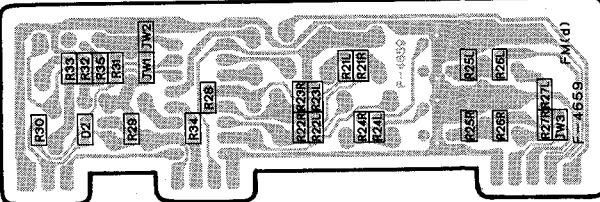
## Parts List

Parts No.	Stock No.	Description
• Transistor dQ1	46393201	2SC2786
• IC dIC1	07191200	LA1231N
• Diode dD1	46852000	RLS-73
dJW1	46741100	Cross Conductor (Chip)
dR1	46745800	180Ω 1/8W Chip R.
dR2	46747000	560Ω 1/8W Chip R.
dR3	46747600	1kΩ 1/8W Chip R.
dR4	46745200	100Ω 1/8W Chip R.
dR5	46747400	820Ω 1/8W Chip R.
dR6	46746600	390Ω 1/8W Chip R.
dR7	46746400	330Ω 1/8W Chip R.
dR8	46752400	100kΩ 1/8W Chip R.
dR9	46750800	22kΩ 1/8W Chip R.
dR10	46750400	15kΩ 1/8W Chip R.
dR11	46748800	3.3kΩ 1/8W Chip R.
dR12	46750000	10kΩ 1/8W Chip R.
dR14	46750000	10kΩ 1/8W Chip R.
dR15	46749600	6.8kΩ 1/8W Chip R.
dC9	08450900	4.7μF 16V E.B.
dCF1	46202500	Ceramic Filter SFE10.7MS2 (RED)
dCF2	46202500	Ceramic Filter SFE10.7MS2 (RED)
dT1	48072100	FM IF Coil
dT2	48072200	FM IF Coil

**4-8. F-4659 FM MPX Circuit Board** (Stock No. 00814401)  
Component Side



### **Pattern Side <Chip Parts>**

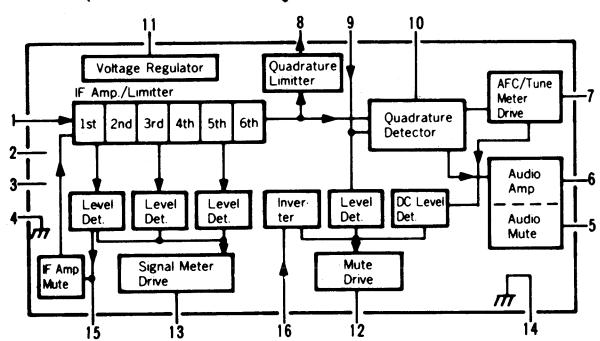


## Parts List

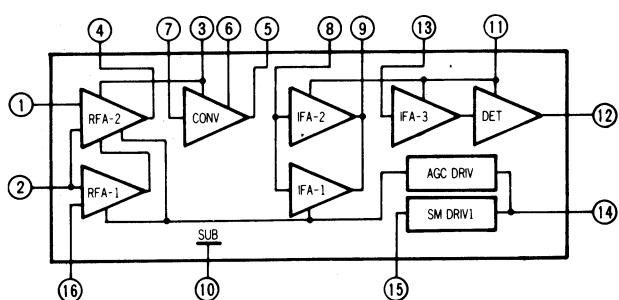
Parts No.	Stock No.	Description
•Transistor		
dQ2	46391901	2SC2785
dQ3	46391901	2SC2785
•IC		
dIC2	03603200	HA1196
•Diode		
dd2	46852000	RLS-73
dJW1	46741100	Cross Conductor (Chip)
dR21	46750200	12k $\Omega$ 1/8W Chip R.
dR22	46751600	47k $\Omega$ 1/8W Chip R.
dR23	46751000	27k $\Omega$ 1/8W Chip R.
dR24	46748400	2.2k $\Omega$ 1/8W Chip R.
dR25	46749400	5.6k $\Omega$ 1/8W Chip R.
dR26	46747600	1k $\Omega$ 1/8W Chip R.
dR27	46748800	3.3k $\Omega$ 1/8W Chip R.
dR28	46753000	180k $\Omega$ 1/8W Chip R.
dR29	46749200	4.7k $\Omega$ 1/8W Chip R.
dR30	46750800	22k $\Omega$ 1/8W Chip R.
dR31	46750800	22k $\Omega$ 1/8W Chip R.
dR32	46750800	22k $\Omega$ 1/8W Chip R.
dR33	46747600	1k $\Omega$ 1/8W Chip R.
dR34	46750800	22k $\Omega$ 1/8W Chip R.
dR35	46753200	220k $\Omega$ 1/8W Chip R.
dC22	46282000	1500pF 50V F.C.
dC24	46531300	5600pF 50V F.C.
dC25	08451200	2.2 $\mu$ F 25V E.B.
dFL1	48072300	Low Pass Filter
dVR1	07241300	10k $\Omega$ (B) S.V.R., VCO adj.

## 5. INTERIOR BLOCK DIAGRAM OF IC & TERMINAL FUNCTION OF TC9157P

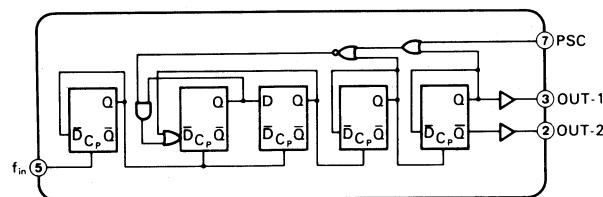
### •LA1231N (FM IF AMP & Quadrature Detector IC)



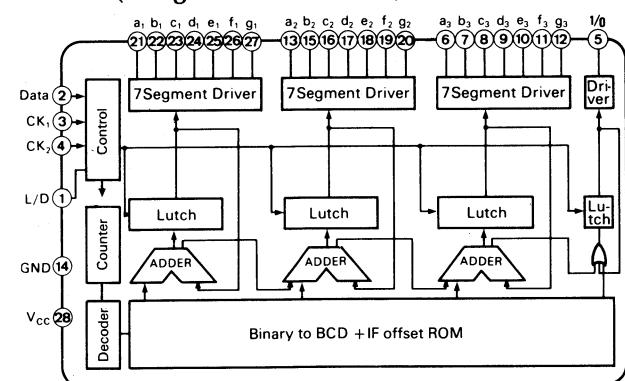
### •LA1240/HAI197 (AM Tuner IC)



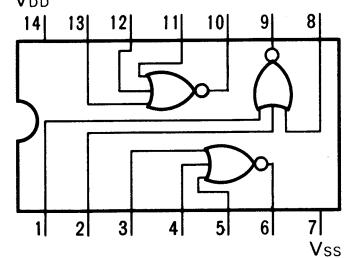
### •TD6104P (Prescaler IC)



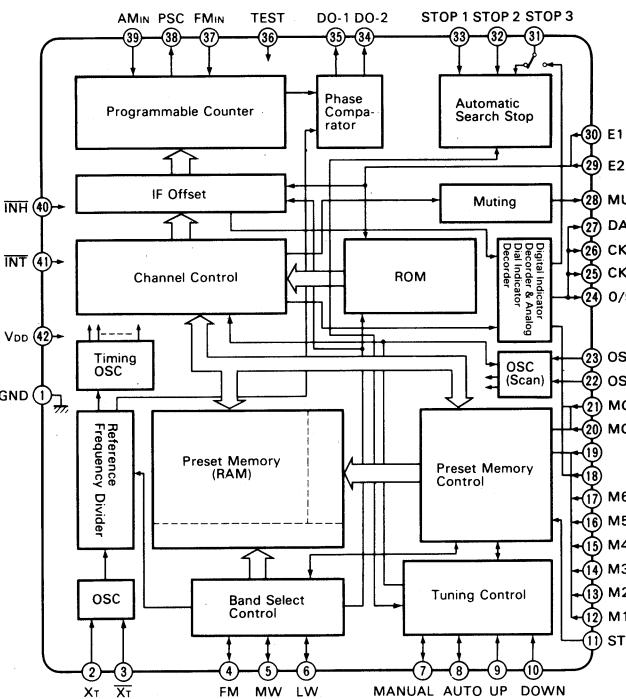
### •TD6301P (7 Segment Decoder IC)



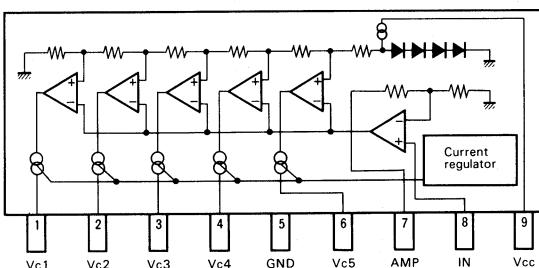
### •TC4025BP/μPD4025BP/MSM4025BRS/HD14025BP (Triple NOR IC)



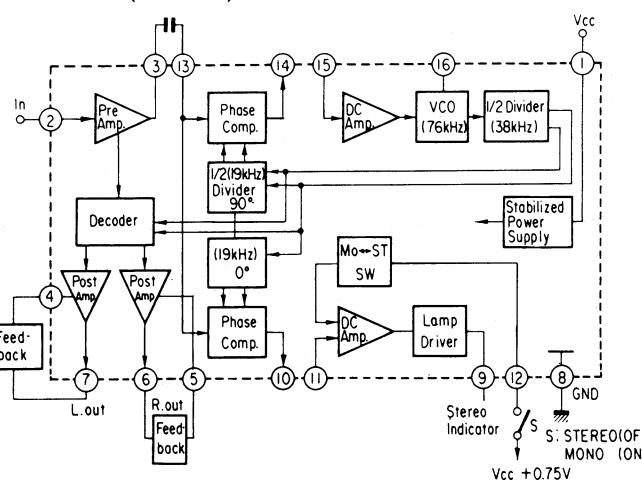
### •TC9157P (PLL & Control IC)



### •BA6137 (L.E.D. Drive IC)



### •HA1196 (MPX IC)



### •Terminal Function of LSI-TC9157P

Pin No.	Pin Name	Functions
2,3	X <sub>T</sub> X <sub>T</sub>	Terminals to connect a quartz oscillator for generating a reference frequency.
4 5 6	FM MW LW	Terminals to input a signal for switching FM/MW/LW band.
7 8	MANUAL AUTO	Terminal to input a signal for switching the manual operation to automatic search operation or vice versa in the UP/DOWN tuning mode. "H": Automatic, "L": Manual
9 10	UP DOWN	Terminals to input a signal from the tuning key. * In manual operation: When the key is kept depressed for 0.3 sec or more in one-step/one-push step feeding, the operation changes to fast forwarding; when the key is released, the operation stops at the next stop. In this case, even if there is a station on the way, the station is neglected. * In automatic search operation: When the key is depressed once, the automatic search operation starts and stops automatically after having selected the desired station.
11	STO	Terminal to input a signal for storing data in the preset memory unit. Input/output terminal in which a LED driver is provided. * When depressing the STO key, the STO lamp comes on. Next, when any desired memory No. key is depressed, the data on receiving frequency is written into the memory unit and the STO lamp goes off. * When the STO key is depressed and the memory No. key is not depressed, the frequency data is released automatically.
12 17	M1 / M6	Terminals to input a signal for designating memory address. Input/output terminals in which a LED driver is provided. * Terminals M <sub>1</sub> to M <sub>6</sub> designate the addresses of FM memory unit in FM receiving and the addresses of AM memory unit in AM receiving. * When depressing the STO key and any desired station key of M <sub>1</sub> to M <sub>6</sub> , the data is written into the memory unit. * When depressing any desired station key of M <sub>1</sub> to M <sub>6</sub> , the data is read out.
22	OSC 2	Terminal to connect a condenser and resistor for the oscillator for determining the speed of AM automatic search operation.
23	OSC 1	Terminal to connect a condenser and resistor for the oscillator for determining the speed of FM automatic search operation.
24 25 26 27	0/5 CK2 CK1 DATA	Terminals to output the data for displaying the received frequency digitally and a timing signal. The data fed to the driver TD6301P for displaying a static frequency and the timing signal are outputted once only when the frequency is updated in such case as when the power supply is tuned on, the UP/DOWN key is depressed, the data are read out of the memory unit, or FM/AM is switched. In the ordinary receiving state, this terminal is fixed to a "L" level. * 0/5: For displaying 50 kHz during FM receiving in Europe. * Data: Binary coded frequency data and receiving band. * CK-1, CK-2: Initialize and transfer clock signals.

Pin No.	Pin Name	Functions
28	MUTE	Terminal to output the muting signal. The terminal is kept in "L" level in ordinary state, and in "H" level in muting.
29 30	E2 E1	Terminals to input a signal for selecting destinations of Japan, USA, and Europe. * Inputs of terminals E <sub>1</sub> and E <sub>2</sub> are read and latched in INH=L state and in FM/AM switching.
31	STOP 3	When an IF450 kHz signal is applied to this terminal during automatic search operation, the scanning operation stops.
32	STOP 2	Terminal to input a signal for performing the automatic search stop. When a "H" level signal is applied to STOP 1 and this terminal during automatic search operation, the scanning operation stops.
33	STOP 1	Terminal to input a signal for slowing the speed of scanning operation. When a "H" level signal is applied to this terminal during automatic search operation, the speed of scanning operation halves.
34 35	D <sub>0-2</sub> D <sub>0-1</sub>	Terminals to output a signal from a phase comparator. These terminals can be used for FM and AM, separately, since the same signal is outputted from the terminals D <sub>0-1</sub> and D <sub>0-2</sub> at the same time.
36	TEST	Terminal to input a signal of test mode. Test mode in "H" level.
37	FMIN	Terminal to input a signal from the FM programmable counter. An amplifier is provided in the input.
38	PSC	Terminal to output a signal for controlling the Prescaler IC of TD6104P.
39	AMIN	Terminal to input a signal from the AM programmable counter. An amplifier is provided in the input.
40	INH	Terminal to input a signal of inhibit. Ordinary operation in "H" level; inhibit operation in "L" level.
41	INT	Terminal to input an initialize signal. This terminal changes to H level in the ordinary operation and to L level in the initialize operation.
42 1	V <sub>DD</sub> GND	Power supply terminals. 5V ± 0.5V.



A

B

C

D

E

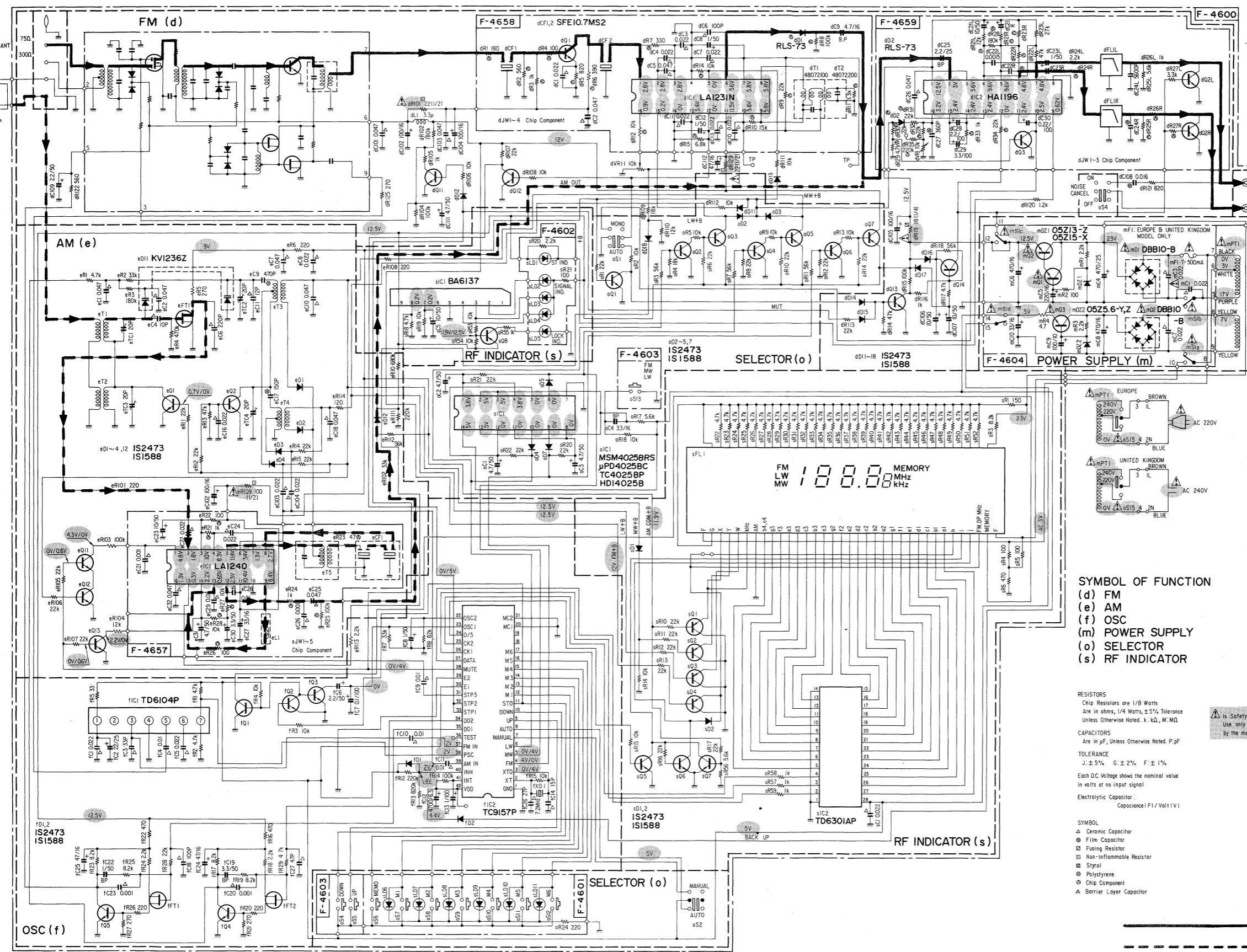
F

G

H

## 6-2. TU-D33XL

\* Design and specifications subject to change without notice for improvement.  
 \* La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.  
 \* Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.



2SC2878 (L,K)  
 2SC2785 (J,H,F,E)  
 2SC2458 (Y,GR)  
 2SC2603 (E,F)  
 2SC2785 (J,H,F,E)

d01  
 d02,3  
 d01,2  
 d01,3  
 d01,2  
 d01,3  
 d01,2  
 d01,3  
 d01,2  
 d01,3

e01,2  
 e04,6  
 e01,1,2  
 e01,2  
 f01,2  
 f03,4  
 f05  
 s05,6  
 s07  
 m01

2SA1048  
 2SA1115  
 2SC2458  
 2SC2603

2SK192A  
 2SK1175  
 2SC2785  
 2SC2786

2SA117  
 2SK192A  
 2SK1175  
 2SK163

BA6137  
 TD6104P

2SC2458 (A,B)  
 2SC2603 (E,F)  
 2SD313AL (D,E,F)  
 2SD880 (Y,GR)  
 2SA115 (E,F)  
 2SA1048 (Y,GR)  
 2SA1175 (J,H,E,F)

PD4025BC  
 HA1196  
 LA1231N  
 LA1440  
 MSM4025BRS  
 TC4025BP  
 TC3147BP  
 TC9157P  
 TD6301AP

Dot Slit or Line  
 DBB10-B

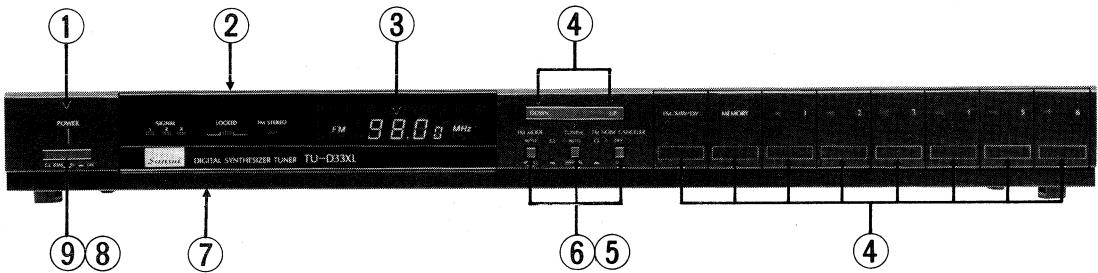
IS2473 TP-3  
 IS2473 T77  
 SEL2210S  
 SEL2410E  
 TLS-123  
 TLY-123

IS1588  
 IS1588

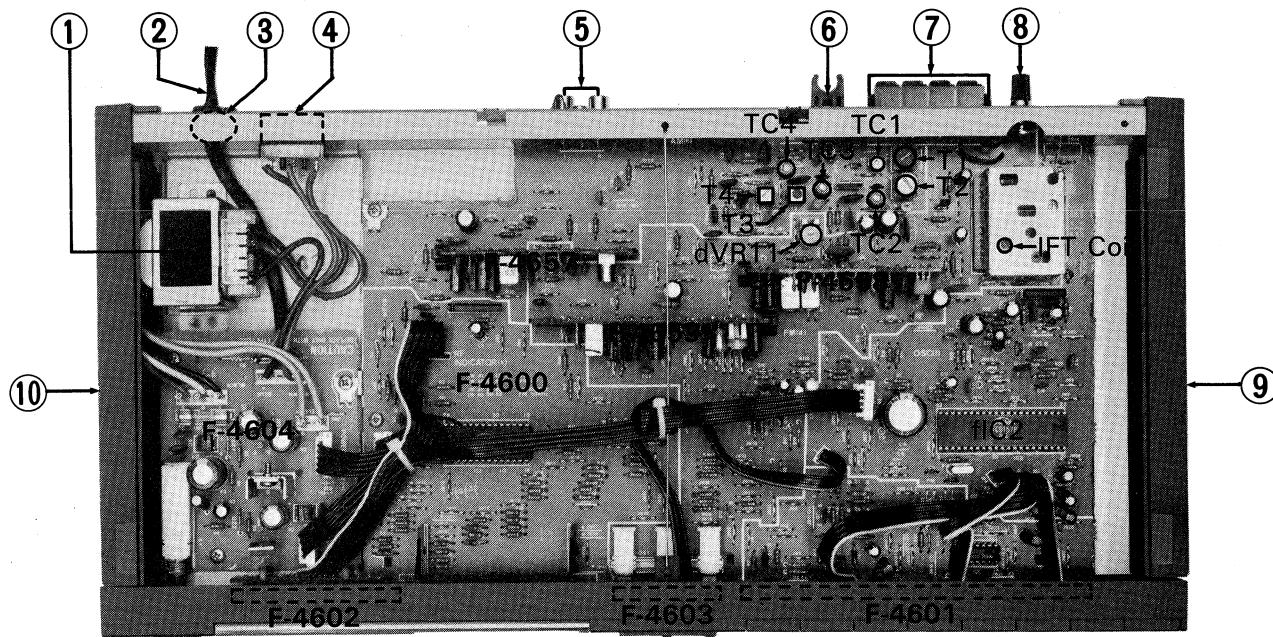
IS2473  
 IS1588

## 7. OTHER PARTS

### 7-1. Front View



### 7-2. Top View



#### Parts List <Front View>

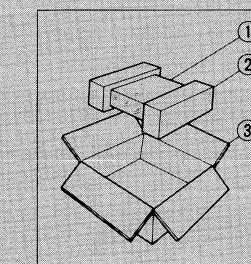
Parts No.	Stock No.	Description
1	47606100	Front Panel Ass'y (TU-D33X)
	47606300	Front Panel Ass'y (TU-D33XL)
2	47602100	Bonnet
3	48056000	FL. Display Tube, FG78L8GR
4	46708100	Push SW., UP, DOWN, FM/AM, MEMORY, 1, 2, 3, 4, 5, 6,
5	07917300	Knob, FM MODE, TUNING, FM NOISE CANCELLER
6	48069500	Push SW., FM MODE, TUNING, FM NOISE CANCELLER
7	48069600	Voltage Selector (TU-D33X-XX, SA)
8	47601400	Knob, POWER
9	46412500	Push SW., POWER (TU-D33X-XX, UL, CSA)
10	46412400	Push SW., POWER (TU-D33X-SA, EU, AS, TU-D33XL)

#### Parts List <Top View>

Parts No.	Stock No.	Description
1	15017801	Power Transformer (TU-D33X-XX, SA)
2	15017802	Power Transformer (TU-D33X-UL, CSA)
3	15017805	Power Transformer (TU-D33X-EU, AS, TU-D33XL)
4	38004700	Power Supply Cord (TU-D33X-XX, UL, CSA, SA)
5	38004500	Power Supply Cord (TU-D33X-EU, TU-D33XL-EU)
6	38004300	Power Supply Cord (TU-D33XL-BS)
7	07204200	Power Supply Cord (TU-D33X-AS)
8	07204300	Power Supply Cord (TU-D33X-AS)
9	39106000	Strain Relief (TU-D33X-XX, UL, CSA, SA)
10	39104900	Strain Relief (TU-D33X-EU, AS, TU-D33XL)
11	07204700	Slide SW., voltage selector (TU-D33X-EU, AS, TU-D33XL)
12	48148500	2P-Terminal, OUTPUT
13	07193200	Antenna Holder
14	46547300	Antenna Terminal
15	22301510	GND Terminal
16	47538000	Side Panel (Right)
17	47537900	Side Panel (Left)

## 8. PACKING LIST

Parts No.	Stock No.	Description
1	07599500	Vinyl Cover
2	47178200	Styrofoam Packing
3	47601000	Carton Case (TU-D33X)
	47601800	Carton Case (TU-D33XL)



## 9. ACCESSORY LIST

Stock No.	Description
38103200	Pin Plug Cord
46051700	FM Antenna
48069700	AM Loop Antenna
46958100	Operating Instruction (TU-D33X)
46958200	Operating Instruction (TU-D33XL)

## 10. NOTES

When the user moves to different channel step area on FM or AM, the following arrangements must be performed.

Sets Applicable to	Channel Step Frequency		fIC1 Input Port Level		Cross Conductor (F-4600)				9k/10k Switch oS14	
	AM	FM	E <sub>1</sub>	E <sub>2</sub>	jw1	jw3	jw4	jw2		
I	South Africa	9 kHz	50 kHz	L	L	—	—	○	○	None
	Europe	9 kHz	50 kHz	H	L	○	—	○	—	None
	America	9 kHz	100 kHz	L	H	—	○	—	○	None
	America	10 kHz	100 kHz	H	H	○	○	—	—	None
II	Sets which 9k/10k Switch is installed	9 kHz	100 kHz	L	H	—	○	—	—	9 kHz
		10 kHz	100 kHz	H	H	—	○	—	—	10 kHz

- Note: 1) L = Low Level, H = High Level, ○ = Connect, — = Remove
- 2) oS14 = AM 9k/10k Switch on F-4600
- 3) Remove the 9k/10 kHz switch only when a user operates the set (II) in 50 kHz channel step (I)

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